Abstract

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Title of Diploma thesis: Use of UHPLC-MS/MS method for the evaluation of the effect of flavouring additives on the content of catechins in tea samples and matrix effects

This diploma thesis is based on the findings published in the Journal of Pharmaceutical and Biomedical Analysis [1], which describes the incidence of matrix effects in several samples of flavored tea infusions. Measured matrix effects were not very high (ranging from -5.3% to + 10.4%), as well as the number of analyzed samples. Therefore, the research in this thesis was focused on the analysis of commercially available teas using a tea bagged (Pickwick) and loose leaf tea (Basilur). Loose leaf tea has been used for the preparation of custom blends with better defined composition. In total, 11 different flavors which are commonly used were tested in this study including: cranberry fruits, mint leaf, rosehip fruit, lemon zest, orange zest, ginger root, rose flower, cinnamon bark, lemon grass, jasmine blossom and vanilla.

Analyses were carried out on the ACQUITY Ultra Performance LC coupled to triple quadrupole mass spectrometer Quattro Micro (Waters) using analytical column ACQUITY CSH C18 2.1 x 100 mm, 1.7 um (Waters) and the analytical conditions described in previously published article [1]. The content of catechins and matrix effects in flavored and unflavored teas was evaluated. Matrix effects were analyzed using the standard addition of eight catechins in the tea infusion. The overall content of catechins and matrix effects of various flavors were evaluated. The differences between unflavored tea and flavored tea better reflects the effect of flavorings on the tea brew. Furthermore two complex mixtures, which consisted of more flavorings, were evaluated. In this thesis, independence of matrix effects on pH was demonstrated as well as positive impact of flavorings on the concentration of catechins in prepared mixtures, which were not due to matrix effects. Furthermore, different amount of the matrix effects in various flavors were observed. Complex mixtures showed combined effect, which was positive in case of non-epiforms and negative in case of epi-forms.

Keywords: UHPLC, MS/MS, matrix effects, catechins, flavourings